Learnlife Eco Hub: pop-up learning space

by Oliver Style / 2022-10-18 00:00:00 / España / 739 / ES

New Construction

Primary energy need:
85 kWhpe/m².year
(Calculation method: Other)

ENERGY CONSUMPTION
Economical building
Building

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<th>Energy-intensive building</th>
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< 80
81 à 90
91 à 120
151 à 250
231 à 350
331 à 450
> 450

Building Type: School, college, university
Construction Year: 2022
Delivery year: 2022
Address 1 - street: Passeig Marítim nº 139-141 08860 CASTELLDEFELS, España
Climate zone: [Csb] Coastal Mediterranean - Mild with cool, dry summer.

Net Floor Area: 99 m²
Construction/refurbishment cost: 120 000 €
Cost/m²: 1212.12 €/m²

Certifications:
Proposed by:

General information

Designed by Solange Espoille, Learnlife Eco Hub is a center for sustainability and innovation located in Castelldefels (Barcelona). It is a flexible Near Zero Energy Building (NZEB) with a non-permanent structure. A building with a very high energy performance, in which the small amount of energy required is largely generated from renewable sources on site.

The building has achieved Passivhaus Classic certification, which offers energy savings of up to 90% compared to conventional buildings, and digitization processes that simplify the entire construction process. To achieve an optimal indoor environment with high energy efficiency, the Zehnder ComfoAir XL 1500 and Zehnder ComfoAir Q600 ventilation systems were used. The Eco Hub consists of two industrialized modules with a wooden structure, built by Tall Fusta with healthy materials with low environmental impact. The windows are from Elke Wood Windows, with meranti wood carpentry, with double low-emissive glass with argon gas. Praxis has carried out the energy simulation in PHPP, the design of the thermal envelope and hermetic layer, advice on low-impact and healthy materials, and optimization and calculation of thermal bridges and construction details.
The purpose is to contribute to improving the environment, creating not only an innovative learning space close to nature, but also a sustainable construction that reduces CO2 emissions on our planet.

See more details about this project
https://praxis-rb.com/pop-up-learning-space/

Data reliability
3rd part certified
https://www.learnlife.com/barcelona-eco-hub

Photo credit
Jordi Vila and Marta/Argot Photo

Stakeholders

Contractor

Name: Learnlife
Contact: Sol Espoille
https://www.learnlife.com/

Construction Manager

Name: Praxis Resilient Buildings
Contact: Oliver Style y Bega Clavero, Calle Ramon Turro 100, 5-7 08005 Barcelona
https://praxis-rb.com/

Function: Developer
Learnlife
Sol Espoille
http://www.learnlife.com/

District Attorney

Function: Certification company
Zephir
Dr. Francesco Nesi
https://passivhausitalia.com/
Passive House Certification

Contracting method
Lump-sum turnkey

Owner approach of sustainability

The premise was to create a sustainable construction with materials of natural origin, whose production process generates less waste, requires low energy consumption and respects nature.

The building has been designed with the idea that it could be a reference model for learning about efficiency and sustainability, allowing its users to participate in the building’s energy cycles and processes.

A basic rainwater harvesting system collects rainwater from rooftops and channels it into a large reservoir for storage. This system provides water to gardens as it contains no chemicals and does not harm the plant microbiome.

“Collecting our own rainwater is a great way to conserve this precious resource”
Energy

Energy consumption

Primary energy need : 85.00 kWhpe/m².year
Primary energy need for standard building : 250.00 kWhpe/m².year
Calculation method : Other
CEEB : 0.0014
Final Energy : 42.00 kWhfe/m².year

Breakdown for energy consumption :
Heating demand: 12.6 kWh/m²
Heating load: 20 W/m²
Cooling demand: 16.2 kWh/m²
Cooling load: 11 W/m²

Envelope performance

Envelope U-Value : 0.27 W.m⁻².K⁻¹

More information :
- Fermacell gypsum fiber board. 13mm
- OSB 3 wood board [airtight layer & vapor barrier]. 18mm
- Wood fiber thermal insulation between wooden structure. 145mm
- OSB wood board. 15mm
- Waterproof & breathable sheet.
- Chamber ventilated. 60mm
- Thermo-treated wood. 15mm

Building Compactness Coefficient : 0.39
Indicator : n50
Air Tightness Value : 0.40

Renewables & systems

Systems

Heating system :
- Heat pump
- Tape

Hot water system :
- Individual electric boiler

Cooling system :
- Reversible heat pump
- Tape

Ventilation system :
- Double flow
- Double flow heat exchanger

https://productos.zehnder.es/es/producto/zehnder-comfoair-xl-1500?stay=true&cHash=b86ab9e6c0c69b4428a272d8e5c69b91

Renewable systems :
- Solar photovoltaic

Renewable energy production : 89.00 %

Other information on HVAC :
Two BAXI NANUK RZGK35 cooling and heating systems with direct expansion cassettes as terminal system.
The use of clean and self-produced solar energy from photovoltaic systems is maximized, reducing electricity costs and contributing to the protection of the environment.

Solutions enhancing nature free gains :
42% of the windows in this project face south, improving solar gain in winter. A sunshade was also incorporated to create shades on the windows during the summer.

Smart Building
BMS:
Electronic control systems have been incorporated to measure and monitor the interior environment, allowing optimal conditions to be maintained to improve results and performance. The monitor records data and reports on the dashboard allowing users to get an instant reading, as well as monitor trends and compare spaces with different environmental factors.

Environment

GHG emissions
GHG in use: 136,60 KgCO₂/m²/year
Methodology used: PHPP

Water management
A basic rainwater harvesting system collects rainwater from rooftops and channels it into a large reservoir for storage. This system provides water to gardens as it contains no chemicals and does not harm the plant microbiome.

“Collecting our own rainwater is a great way to conserve this precious resource”

Indoor Air quality
To achieve an optimal indoor environment, materials with low emissions of Volatile Organic Compounds (VOCs) have been used, together with a ventilation system with PassivHaus Zehnder ComfoAir XL 1500 component certification, which constantly renews the indoor air, with high energy efficiency.

Comfort
Measured indoor CO₂ concentration:
01/07/2022 - 31/07/2022: Máximos de 494 PPM de CO₂

Products

Product
ComfoAir XL 1500
Zehnder Group Nederland B.V.
+31 38 429 6911
https://www.zehnder.nl/
Product category: PassivHaus certified ventilation system with sensible heat recovery.

NANUK RZGK35
BAXI
900 80 20 68
https://www.baxi.es/
Product category: Heating and cooling system with cassettes as an expansion system.

MTIO SLVP 6.5
Cointra
+34 916 707 459
https://www.cointra.es/
Product category: Electric water heater.
Elke Wood Windows
+34 931 358 610
https://www.elke.cat/
Product category:
Carpintería de madera con una transmisividad de calor baja. (1.6 W/(m²K))

Buo Home
info@buohome.com
https://www.buohome.com/
Product category:
Monitoring system manufactured by Buo Home

Techno PIEUX
info.espana@technopieux.es
https://www.technopieux.com/es-ES/
Product category:
The ability to install the steel piles and build on top of them in the same day greatly increases production. Add in the fact that I save huge amounts of money and labor by not having to do earthworks, haul concrete and clean up the mess.

Costs

Construction and exploitation costs

Total cost of the building: 120 000 €

Building Environnemental Quality

- indoor air quality and health
- consultation - cooperation
- acoustics
- comfort (visual, olfactory, thermal)
- energy efficiency
- renewable energies
- products and materials

Contest

Reasons for participating in the competition(s)

Proyectado por Solange Espiolle, Learnlife Eco Hub es un centro de sostenibilidad e innovación situado en Castelldefels (Barcelona). Se trata de un edificio de energía casi nula (NZEB), flexible, con una estructura no permanente. Un edificio con un rendimiento energético muy alto, en el que la pequeña cantidad de energía necesaria se genera en gran medida a partir de fuentes renovables en situ. La premisa era crear una construcción sostenible con materiales de origen...